INTERNATIONAL PROJECTIONIST

AUGUST 1953

VOLUME 28 • NUMBER 8

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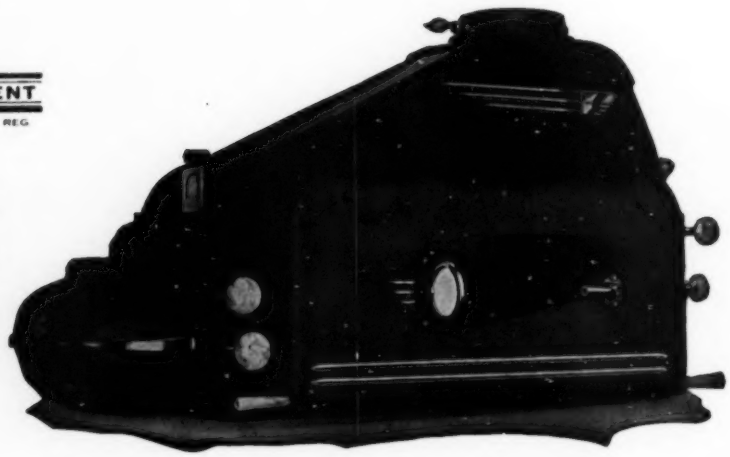

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Volume 28 AUGUST 1953 *Number 8*

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MONTHLY CHAT

THE SHOUTING is over — for the moment — and the captains and the kings of the motion picture industry have departed from Washington after a valiant battle on behalf of the Mason Bill. IP stands back of this legislation. We feel that the working projectionist has as much at stake in the lifting of the nefarious 20 per cent tax on movie admissions as anybody else. With President Eisenhower's "pocket veto" of the bill early this month we have lost a battle — but we haven't lost the campaign!

To use language that General Eisenhower would understand quite well, we had the men, the materiel, the will to fight, plus a good cause for which to do battle. But we had, on the exhibitor level at least, some gosh awful public relations.

In the opinion of IP (And any good PRO, from the most expensive Madison Avenue practitioner of the art to the lowest two-bit Broadway press agent, would agree), a public relations blunder was a major influence while the President was weighing his decision.

Congress passed the Mason Bill by one of the thumpingest majorities since Inauguration Day. The case presented by the Council of Motion Picture Organizations at Washington hearings was good, well documented and obviously persuasive. So what happened?

Congress passed the bill and, while it lay on the President's desk, exhibitors rushed into their local newspapers and into the trade press with joyous shouts, yipping for all the world to hear — including the delicately attuned ears in the White House — that "We're going to grab that 20 per cent for ourselves!"

If only one exhibitor, one lone theatre owner, any place, announced plans to cut admission prices to the public and so help lure people away from their Tv sets, IP somehow missed hearing about him.

While we agree that a portion of the tax savings should be retained by the exhibitor, and so passed on to the distributor and the producer, we feel strongly that a portion should be passed along to the guy at the ticket window. The White House might have been hard put to explain away a veto had the public weal been involved. But the minute the exhibitors announced their intention to gobble every nickel of the savings, the Mason Bill became legislation on behalf of a "special interest." Americans, by tradition, don't like "special interests" — and so the Mason Bill is history. At least until Congress reconvenes in January.

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"THERE'S A BRANCH NEAR YOU"

VOLUME XXVIII AUGUST, 1953 NUMBER 8

Is 3-D as revolutionary as sound? In this article, the first in a new series, Mr. Mitchell evaluates the 3-D process in general under the title of

Stereovision and "Convergence" Technique

Stereoscopic Projection and Photography

By ROBERT A. MITCHELL

SPACE as we know it is characterized by a property of "extension" which, for geometrical convenience, is analyzed into three 'dimensions' — height, breadth, and depth.

Paintings, ordinary photographs, and conventional movies are pictorial representations produced on 2-dimensional surfaces. Surfaces, such as motion-picture screens, have height and breadth, but no depth, and yet depth in ordinary "2-D" pictures is automatically indicated by such geometrical phenomena as foreshortening and perspective, and is often startlingly enhanced by differences in the focal clarity of near and distant objects, natural conditions of light and shade, atmospheric veiling of distant backgrounds, and so forth.

In conventional motion pictures other factors may be introduced to increase the illusion of depth. To emphasize the length of a long corridor, for example, the cinematographer chooses a short-focus lens and places his camera at a low elevation. This trick gives excellent distance, and "dolly shots", in which the camera is slowly moved about while operating, provide a very close approach to true stereoscopy (solid vision). This stratagem foils the physical flatness of the screen to give depth.

Depth in Standard Films

Because conventional movies, even though non-stereoscopic, provide very good illusions of depth without the psychovisual confusion arising from misinterpretations of the distances of objects, it may truthfully be said that the projectionist has been "projecting the third dimension" ever since the inception of motion pictures.

True 3-D stereoscopy is certainly not essential either to the pictorial excellence or to the dramatic power of the movies. In fact, 3-D seems to detract from both of these qualities and diminishes the appeal of moviegoing as a means of relaxation and emotional refueling demanding a minimum of mental and visual effort. 3-D imposes visual fatigue and physical discomfort, and it is beginning, even at this early stage of the game, to show definite signs of irritating patrons for whom its novelty-value has ceased to exist. What cinemastereoscopy *does* contribute to the theatre is stereopsis, the direct depth-perception effect of binocular vision.

Stereoscopy impresses many people as a very minor addition to the illusion of reality created by theatre movies. It is certainly not an unmixed blessing; and the proponents of 3-D have yet to convince this writer that the commercial inception of a rather cumbersome and makeshift 3-D process in 1953 is a technical development comparable in magnitude to the commercial inception of sound in 1928.

Sound, when it came, widened the scope of the screen immensely without seriously impairing the fluidity of action and dramatic freedom of the movies. What, if anything, can stereoscopy contribute to the story-telling power of the screen?

We have a good right to ask this question because, if a 3-D film be a good one, the patron ignores the stereoscopy the moment he is carried away by the drama. Likewise, a patron watching a good "2-D" film ignores the absence of stereoscopy as soon as he becomes absorbed in the story. It is amusingly ironic, perhaps, that the better 3-D productions have been

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praised by critics because in them stereoscopy has been subdued and reduced almost to the vanishing point. Can this presage a return to "2-D" *via* the Polaroid route?

Film critics, however, no longer view 3-D as a novelty. The average person who attends a 3-D showing merely to get a look at the third dimension prefers depth and plenty of it. Just once, that is!

As a novelty that packs uninitiated moviegoers into the theatres even in spite of increased admission prices and terrific ocular punishment, motion-picture stereoscopy is a power to reckon with. But when the novelty has worn off, stereoscopy for its own sake assumes its real size as an admittedly puny factor in the overall picture. The patron then grumbles at his dim Polaroid glasses, at the eyestrain induced by incredibly bad 3-D photographic techniques, at the annoying reel-change intermissions, and at every other nuisance which 3-D creates for him.

These observations are not intended as a blanket condemnation of cinema-stereoscopy. We may indeed be thankful that 3-D came along when it did to inject the life-blood of variety into the offerings of the film theatre. As a consequence, public interest in *all* theatre movies is stirring from its slumber, and attendance at conventional "2-D" showings has risen. Most significant of all, the demand for emotional, strongly plotted, fast-moving conventional pictures increases as the public tires of 3-D.

Calm Outlook Needed

We are forced to conclude from the popular reaction to 3-D, first as a novelty and then as an unwieldy mode of translating a story to the screen, that the present-day "revolution" in the film industry is largely wishful thinking. This is to be expected of an industry maddened by desperation and largely unwilling to return to the simpler and more effective techniques of its creative youth.

It is, of course, true that the first 3-D feature films have labored under the serious disadvantages of "convergence" photography and a host of other technological boners; but it cannot be denied that the mechanical realism of stereoscopy threatens to stifle the versatility and subtlety of the screen. We sit at attention during 3-D showings (how could we possibly relax?) but we are not emotionally affected by stereoscopy as we have been moved countless times in the past by pictorial delineation and by speech and music. This is a danger sign that neither producer nor exhibitor can afford to ignore.

Good for Boxoffice

Regardless of the present turmoil in the exhibition field, cinemastereoscopy should neither disgust nor dismay the projectionist, nor should it engulf him in a passing wave of baseless enthusiasm. Let him consider 3-D as a stimulant that the theatre badly needs in these uncertain times, as a novelty-process that demands careful attention to details to make it reasonably acceptable both to his audiences and to his own standards of perfection. Let him also keep in mind the fact that present 3-D production technique goes on and on creating defects that no projectionist on earth can correct.

In order to understand the nature and effects of some of the irremediable technical boners consistently committed by many producers of 3-D films, it is necessary to have a good understanding of the basic principles of stereoscopic vision and photography.

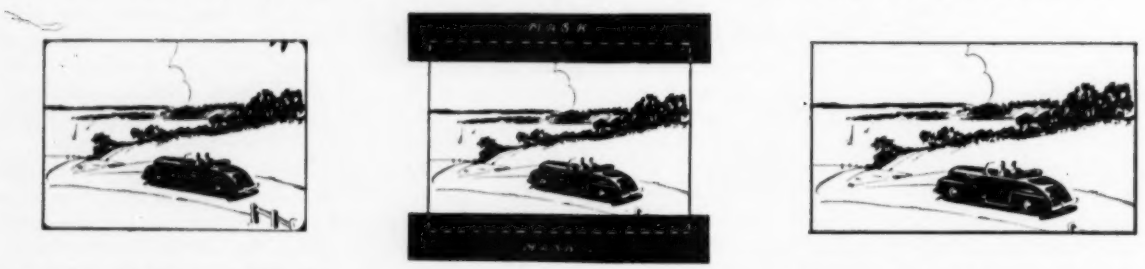
Stereo Theory Simple

The elementary theory of stereophotography is simple enough. In normal viewing we look at things with two eyes. Because the eyes are 2⅝ inches apart, the view seen by one of our two eyes is slightly different from the view seen by the other. Combination of the visual stimuli induced by these two slightly different retinal impressions in the brain results in that direct perception of depth called stereopsis.

Euclid, the famous Greek-Egyptian geometrician, understood the theory of stereoscopic vision, as did many other brilliant minds of the ancient world. Sir Charles Wheatstone studied stereoscopic effects intensively in 1833. The old-fashioned stereoscope of our grandparents was invented by Sir David Brewster in 1849 and was manufactured in quantity the following year by A. Ross of London and J. Dubosq of Paris.

Brewster's stereoscope is noteworthy in that it utilizes eccentric portions of a biconvex lens as the two viewing lenses, thus permitting the left and right photographs to be placed somewhat farther apart than the distance separating our two eyes. This enabled fairly large photographs to be used on the stereogram cards; and although Brewster's instrument introduces binocular aberrations which do not exist in modern "View Master"

MASKING OF PROJECTION APERTURE CONVERTS FILMS FOR WIDE-SCREEN SHOWING



ABOVE ILLUSTRATIONS show steps in transition of a standard film frame to wide-screen. Picture at left appears in the conventional 1.33 to 1 ratio. Center picture shows how masks are employed in the projector to "crop" image top and bottom. With a wide-angle lens on projector, image is then thrown on wide screen in the new rectangular format shown at right. Picture height remains same as in normal projection; only the width is increased. Except for very full closeups, few scenes are affected by the "cropping" or masking.

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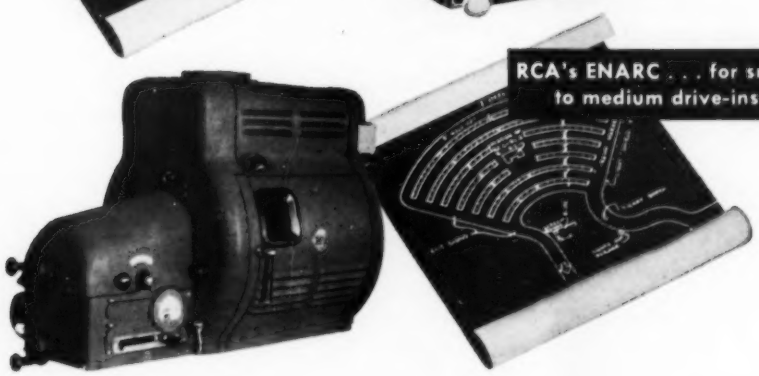

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and "Stereo-Realist" stereoscopes, it was eminently satisfactory in its day.

How Images Differ

How does the left-eye visual impression (or photograph) differ from the right-eye impression? An experiment will illustrate.

Hold a pencil at arm's length and look past it to a distant wall, or else out the window. Close the left eye and note the apparent position of the pencil against the background as seen by the right eye alone.

Now open the left eye and close the right eye without moving the pencil. Viewed by the left eye alone, the pencil is *apparently* displaced to the right of its previous apparent position — even though it hasn't really moved at all. This illusion is called "parallax," and it can be measured like any other small angle.

This simple experiment enables us to distinguish by inspection the right-eye and left-eye images of a photographic "stereopair."

RULE:—*In the left-eye photograph foreground objects are displaced to the right (relative to background objects). Conversely, in the right-eye photograph foreground objects are displaced to the left.*

Checking 3-D Films

With this rule in mind, the projectionist can tell which is the left and which is the right "section" of 3-D release prints even when the identification leaders are missing. *Corresponding* frames of both sections should be compared with each other. A strong magnifying glass is essential because the pictorial details are so tiny and the displacements due to parallax are so small.

To photograph a movie scene stereoscopically it is only necessary to set up two cameras side by side and run them in synchronism. One camera photographs the left-eye view, and the other the right-eye view.

The lenses of the two cameras, which must be identical in focal length are separated by a few inches to obtain the desired stereoscopic effect. Since human eyes have, on the average, an interpupilary distance of 2⅝ inches, the two camera lenses must have a center-to-center distance of at least 2⅝ inches, and preferably more in most cases.

Professional motion-picture cameras, however, are so bulky that the distance separating their lenses would turn out to be much too great if two of them were placed side by side as close together as they could come. So in practice two cameras are pointed directly at each other, and diagonal mirrors or reflecting prisms are used for reflecting the scene into the lenses.

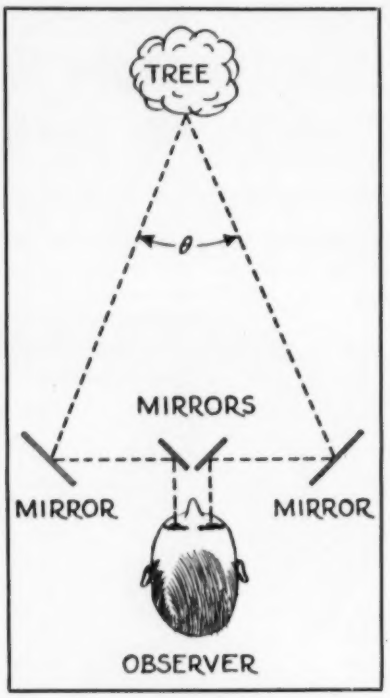

FIGURE 1

The distance from center to center of the two mirrors then becomes the interocular distance which determines the degree of stereopsis.

Double-duty 3-D movie cameras may, of course, be used in place of the set-up involving two ordinary cameras. Such special cameras run two films simultaneously and have two lenses. So far, however, the 2-camera system has been most widely used.

The interocular distance of our two eyes remains fixed—we have no means for spreading our eyes farther apart or for bringing them closer together. And the focal length of our pupils changes very little. Cinematographers, however, have at their disposal a large assortment of camera lenses of widely different focal lengths and they sometimes change their lenses in order to get a desired pictorial composition, distance-effect, or depth of focus. For this reason the entire field of view of the camera may be much smaller than prevails in normal vision. In a case like this, the effect of a given interocular distance may prove very unsatisfactory. In the better 3-D camera-equipments, therefore, the interocular distance can be varied from 3 to 6 or even 12 inches.

Lenses Effect Depth

Lenses of long focus may result in a "close-up" picture even though the camera is positioned quite far away from the action photographed. The extreme case occurs when telephoto lenses are used. Interocular distance (the distance between the centers of the diagonal mirrors) must be increased as the focal length of the lenses is increased *if the same binocular parallax and degree of stereoscopic depth-effect is to be maintained.*

Needless to say, a uniform degree of stereopsis is desirable in all of the many scenes of a picture. Cinematographers can assure themselves of uniform stereopsis by never changing their lenses, of course; but it would be a distinct disservice to the art of cinematography to tie the cameraman's hands in this respect.

It is therefore utterly unsound to specify a single interocular distance for all cases. Yet this is just what some of the "experts" have done!

If the interocular distance be too small, the stereoscopic effect will be disappointingly slight and if it be too great, depth will be exaggerated. The unfortunate result of too great an exaggeration of depth is twofold: the eyes of the movie patron cannot converge satisfactorily upon very close objects in the picture, and all objects appear like miniatures. It is good 3-D practice to exaggerate depth, but only very slightly.

Simple Experiment

The reader can easily perform an experiment to verify what has been said concerning the effects of excessively exaggerated depth. Take a narrow board about 3 feet long and attach to it mirrors positioned diagonally as shown in Fig. 1. The two inside mirrors should have a center-to-center distance of about 2⅝ inches. The distance of the outside mirrors from the inside ones may be varied for different depth effects. It will be observed that as the distance of the

(Continued on page 22)

Confusion Says-

Natural Vision?
Columbia 3-D?
Vitascope?
Tru-Stereo?

RKO Radio 3-D?
Stereo-Cine?
CinemaScope?
20TH-Fox 3-D?

Zeiss-Ikon 3-D?
Todd-AO Wide Screen?
Metrovision?
Paravision?

Polaroid 3-D?
Regiscope Wide-Screen 3-D?
U-I 3-D?
Warner 3-D?
Cinerama?

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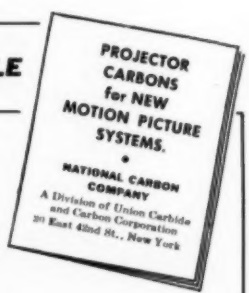
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Converting Theatres for CinemaScope

In response to many requests for information on the equipment used in converting theatres for the CinemaScope system of projection, IP presents the following abstracts from a manual on the subject just issued by 20th Century-Fox.

CINEMASCOPE projection is a method of presenting motion pictures through an anamorphic lens that expands the picture horizontally on a wide, concave screen. The CinemaScope picture is compressed when filmed through an anamorphic camera lens and then expanded by a similar lens in projection.

In addition, the system incorporates a stereophonic sound system that uses a film-driven soundhead designed to pick up the multiple magnetic sound tracks that are also included on the film. Also required is a multiple installation of amplifiers, speaker assemblies and allied equipment needed for stereophonic sound.

Following is detailed information concerning this equipment and instructions for theatre surveys for its installation:

The Anamorphic Lens

The anamorphic lenses supplied with the CinemaScope equipment package have been designed as frontal attachments to the regular projection lenses, and represent an approximate 6½ inches of extension beyond such projection lenses in installations using projection lenses of a diameter of 2-25/32 inches, and an approximate 9½ inches in installations using projection lenses of a diameter of 4 inches.

At the present time, projection lenses of focal lengths of 5 inches or less are furnished in barrel diameters of 2-25/32 inches, and projection lenses in focal lengths of 5.25 inches and over are furnished in barrel diameters of 4 inches, though in older types these longer focal-length lenses appear in the smaller diameter barrels. It is recommended, however, that this latter type be replaced by newer, high-speed lenses.

The Aperture

The aperture dimension for the CinemaScope picture is .715 by .912, resulting in an increase in height of the present picture by about one-sixth if the present projection lenses are retained. In practice this dimension is entirely exact only in case of head-on projection.

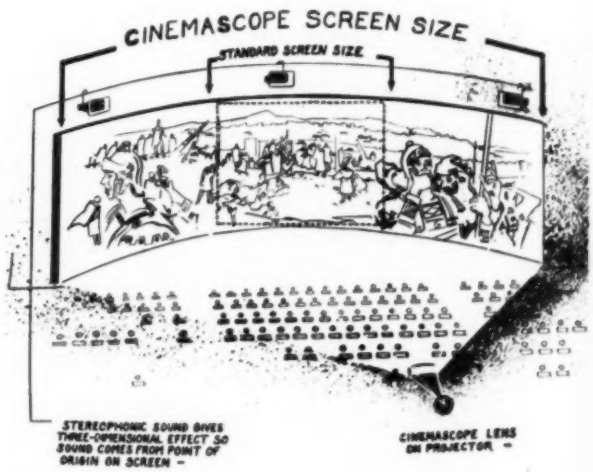
"Squeezed" by CinemaScope's anamorphic lens, Richard Burton and Jean Simmons are shown in a scene from "The Robe."

In angular projection, that is at greater angles of projection than zero degrees, the aperture plate, being delivered with a lesser opening than its nominal dimension, may be filed to the opening required by the individual situation as a correction for keystone. This is, at present, an on-the-job operation.

Accompanying this article is a chart of the CinemaScope picture sizes resulting from the use of various focal-length lenses at various throws at intervals of 10 feet. Since heights increase somewhat with the angle of throw, some account must be taken of this difference. It should also be remembered that the picture widths given are figured upon the chord of the screen and not upon its arc. That is to say the width of a CinemaScope picture is measured by a straight line connecting both edges of the picture and not by a line following the arc.

The Projection Ports

Since the beam from the anamorphic lens diverges immediately after it leaves the lens, and the width of the beam is, generally speaking, more than double the width of the present beam, the present beam should be measured at the port, and at any enframement of the port, to determine the width re-


CINEMASCOPE SCREEN SIZE
STANDARD SCREEN SIZE
STEREOPHONIC SOUND GIVES THREE-DIMENSIONAL EFFECT SO SOUND COMES FROM POINT OF ORIGIN ON SCREEN
CINEMASCOPE LENS ON PROJECTOR

Dotted lines in the sketch show the size of the conventional screen contrasted with the CinemaScope "Miracle Mirror" screen.

quired for the CinemaScope beam. Where necessary, ports must be enlarged and enframement of the ports cut away.

The CinemaScope Screen

The Miracle Mirror screen delivered with the CinemaScope package will be fabricated and delivered in the overall sizes required, webbed and grommeted, the latter on 6-inch centers with an additional grommet at each end of all seams.

There are two types of surface design available, one for projection angles approximately 10 to 12 degrees and greater and known as Type M-5 or tilted pattern, and one for projection angles less than approximately 10 to 12 degrees, and known as Type M-2 or head-on pattern. The angles of projection and the proportions of a particular theatre, including the angle of the balcony, if any, determine which type of screen is best for a particular house.

The screen must be mounted in a

CinemaScope Projection Table — Aperture 0.912" x 0.715"

Focal Length Inches	PROJECTION DISTANCE – FEET																
	40'	50'	60'	70'	80'	90'	100'	110'	120'	130'	140'	150'	160'	170'	180'	190'	200'
2.00	36.5 14.3	45.6 17.9	54.7 21.5	63.8 25.0	72.9 28.6	82.0 32.2	91.2 35.8										
2.25	32.4 12.7	40.5 15.9	48.6 19.1	56.7 22.2	64.8 25.4	72.9 28.6	81.0 31.8										
2.50	29.3 11.4	36.5 14.3	43.7 17.2	51.0 20.0	58.3 22.9	65.6 25.7	72.9 28.6	80.2 31.5									
2.75	26.5 10.4	33.1 13.0	39.8 15.6	46.4 18.2	53.0 20.8	59.6 23.4	66.3 26.0	72.9 28.6	79.6 31.2								
3.00	24.3 9.5	30.4 11.9	36.5 14.3	42.5 16.7	48.6 19.1	54.7 21.5	60.1 23.8	66.9 26.2	72.9 28.6	79.0 31.0							
3.25	22.4 8.8	28.1 11.0	33.7 13.2	39.3 15.4	44.9 17.6	50.5 19.8	56.1 22.0	61.7 24.2	67.3 26.4	72.9 28.6	78.5 30.8						
3.50	20.8 8.2	26.0 10.2	31.3 12.3	36.5 14.3	41.7 16.4	46.9 18.4	52.1 20.4	57.3 22.5	62.5 24.5	67.7 26.6	72.9 28.6	78.1 30.6					
3.75	19.4 7.6	24.3 9.5	29.2 11.4	34.0 13.4	38.9 15.3	43.7 17.2	48.6 19.1	53.5 21.0	58.4 22.9	63.2 24.8	68.1 26.7	72.9 28.6	77.8 30.5				
4.00		22.8 8.9	27.3 10.7	31.9 12.5	36.5 14.3	41.0 16.1	45.6 17.9	50.1 19.7	54.7 21.5	59.3 23.2	63.8 25.0	68.4 26.8	72.9 28.6	77.5 30.4			
4.25		21.4 8.4	25.7 10.1	30.0 11.8	34.3 13.5	38.6 15.2	42.9 16.8	47.2 18.5	51.5 20.2	55.8 21.9	60.0 23.6	64.4 25.2	68.6 26.9	72.9 28.6	77.2 30.3		
4.50		20.3 7.9	24.3 9.5	28.4 11.1	32.4 12.7	36.5 14.3	40.5 15.9	44.5 17.5	48.6 19.1	52.6 20.7	56.7 22.2	60.7 23.8	64.8 25.4	68.8 27.0	72.9 28.6	77.0 30.2	
4.75		19.2 7.5	23.0 9.0	26.9 10.5	30.7 12.0	34.5 13.6	38.4 15.1	42.2 16.6	46.1 18.1	49.9 19.6	53.7 21.1	57.6 22.6	61.4 24.1	65.3 25.6	69.1 27.1	72.9 28.6	76.8 30.1
5.00			21.9 8.6	25.5 10.0	29.2 11.4	32.8 12.9	36.5 14.3	40.1 15.7	43.8 17.2	47.4 18.6	51.0 20.0	54.7 21.5	58.3 22.9	62.0 24.3	65.6 25.7	69.2 27.2	72.9 28.6
5.25			20.8 8.2	24.3 9.5	27.8 10.9	31.2 12.3	34.7 13.6	38.2 15.0	41.7 16.3	45.2 17.7	48.6 19.1	52.1 20.4	55.6 21.8	59.0 23.2	62.5 24.5	66.0 25.9	69.4 27.2
5.50			19.9 7.8	23.2 9.1	26.5 10.4	29.8 11.7	33.1 13.0	36.5 14.3	39.8 15.6	43.1 16.9	46.4 18.2	49.7 19.5	53.0 20.8	56.3 22.1	59.6 23.4	63.0 24.7	66.3 26.0
5.75				22.2 8.7	25.4 10.0	28.5 11.2	31.7 12.4	34.9 13.7	38.0 14.9	41.2 16.2	44.4 17.4	47.6 18.7	50.7 19.9	53.9 21.1	57.1 22.4	60.2 23.6	63.4 24.9
6.00				21.3 8.3	24.3 9.5	27.3 10.7	30.4 11.9	33.4 13.1	36.5 14.3	39.5 15.5	42.6 16.7	45.6 17.9	48.6 19.1	51.7 20.3	54.7 21.5	57.7 22.6	60.8 23.8
6.25				20.4 8.0	23.4 9.2	26.1 10.3	29.2 11.4	32.1 12.6	35.0 13.7	37.9 14.9	40.9 16.0	43.8 17.2	46.7 18.3	49.6 19.5	52.5 20.6	55.4 21.7	58.4 22.9
6.50					22.4 8.8	25.2 9.9	28.1 11.0	30.9 12.1	33.7 13.2	36.5 14.3	39.3 15.4	42.1 16.5	44.9 17.6	47.7 18.7	50.5 19.8	53.3 20.9	56.1 22.0
6.75					21.6 8.5	24.3 9.5	27.0 10.6	29.7 11.7	32.4 12.7	35.1 13.8	37.8 14.8	40.5 15.9	43.2 17.0	45.9 18.0	48.6 19.1	51.3 20.1	54.0 21.2
7.00					20.8 8.2	23.4 9.2	26.0 10.2	28.7 11.2	31.3 12.3	33.9 13.3	36.5 14.3	39.1 15.3	41.7 16.4	44.3 17.4	46.9 18.4	49.5 19.4	52.1 20.4
7.50							24.3 9.5	26.8 10.5	29.2 11.4	31.6 12.4	34.0 13.4	36.5 14.3	38.9 15.3	41.3 16.2	43.7 17.2	46.2 18.1	48.6 19.1
8.00							22.8 8.9	25.1 9.8	27.3 10.7	29.6 11.6	31.9 12.5	34.2 13.4	36.5 14.3	38.7 15.2	41.0 16.1	43.3 17.0	45.6 17.9
8.50								23.6 9.3	25.7 10.1	27.9 10.9	30.0 11.8	32.2 12.6	34.3 13.5	36.5 14.3	38.6 15.2	40.7 16.0	42.9 16.8
9.00									24.3 9.5	26.3 10.3	28.4 11.1	30.4 11.9	32.4 12.7	34.4 13.5	36.5 14.3	38.5 15.1	40.5 15.9
	40'	50'	60'	70'	80'	90'	100'	110'	120'	130'	140'	150'	160'	170'	180'	190'	200'

Above is a chart of CinemaScope picture sizes resulting from the use of standard focal length lenses at various throws at intervals of ten feet. Sizes given are to the nearest tenth of a foot. In theatres retaining their present projection lenses, the CinemaScope aperture dimension, differing from the standard aperture of 0.825 x 0.600 inches, will result in a picture height increase of about one sixth.

The sound that c-r-e-a-k-s across the room

TODAY sound keeps pace with action . . . fills first one area, then another, then all of the screen with rich 3-dimensional reality.

Here again is proof positive of the solution of complex problems of production, processing, and projection—many of them met and solved by an alert industry working in co-operation with complete facilities such as the Eastman Motion Picture Film Service.

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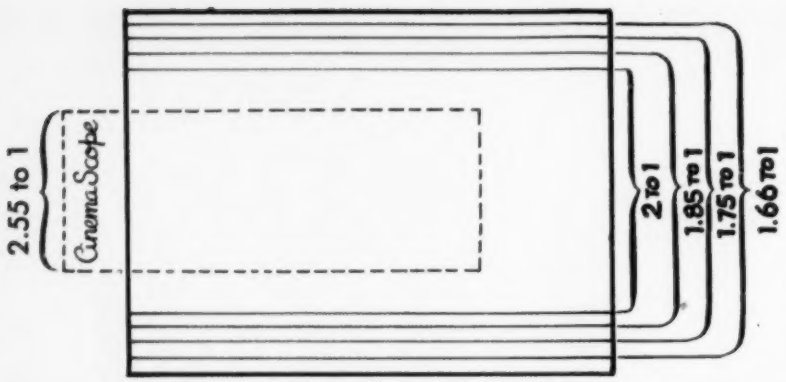


CinemaScope's screen proportions are shown above by dotted lines in contrast to the aspect ratios proposed by other Hollywood studios for wide-screen projection with altered aperture plates and shorter focal-length lenses. The CinemaScope picture is much wider in relation to height, providing a sweeping, panoramic image.

suitable frame and in a smooth concave curve, the arc of which is the picture throw or as close thereto as possible. In many instances, a cord or tape affixed to the projection booth wall at a point between the two projection ports, may be used as a radius to describe the arc upon the floor of the stage.

In addition to the shaping of the aperture, where an angle of projection is 14 to 15 degrees or more, some tilt should be given the entire concave screen and frame to overcome keystone, but in practically every case this should not exceed 5 to 6 degrees.

Some means of varying the tilt of the screen is desirable, but attention is called to the fact that, as a concave screen is tilted, its outer extremities rise. This situation should be recognized in the design and construction of the frame.

Since the picture width is computed upon the chord of the screen, the arc of the chord should be computed in order to obtain the width of screen necessary, and the height should be determined from the exhibitors' calculations in respect to the size of the CinemaScope picture he desires, the size of the conventional picture he desires, and the size he might require for other methods of projection.

Masking the Screen

The screen and frame should be masked top and bottom to the established height of the picture, placing the bottom of the CinemaScope picture as close to the floor of the stage as possible, or as low as the sight lines permit.

Since, as has been mentioned before the outer ends of the picture projected upon a curved or concave screen rise from the floor when the picture is tilted, a bottom masking with a curved top is indicated for such tilted installations. However, since the public has been accustomed to the straight lines of present markings and since the curved masking presents several additional problems, the bottom masking may be installed level in most instances provided it does not mask essential portions of the center of the picture upon which it must incroach.

The side maskings should be adjustable in width, possibly with a stiffened leading edge, to close in to mask the sheet for conventional pictures, and to open up to mask the screen for CinemaScope. This may be done by supporting the side masking on tracks with suitable stops on the tracks and at the floor, or by other means.

Stereophonic Sound

The stereophonic sound system, basically an integral part of the CinemaScope system, consists of an element to be attached to the projection head at its intersection with the upper magazine, designed to pick up the magnetic tracks of the picture film, together with the necessary pre-amplifiers, matched amplifier and speaker assemblies with monitor and other associated equipment.

The operation of this element will be controlled by switching arrangements as will the photographic pick-up in the present soundhead, permitting them to operate independently of one another as desired.

Since, in addition to the three primary magnetic sound tracks required for stereophonic sound, CinemaScope films will be supplied with a fourth effects and control track, some theatres may wish to extend the range of participation of effect into the auditorium where an additional pre-amplifier and amplifier will be required, together with a number of house speakers as may be indicated by survey.

Transistor's 5th Birthday

The transistor, that tiny but revolutionary electronic device capable of taking over many of the functions of the vacuum tube and performing a number of other tasks, has been much improved since its announcement 5 years ago by Bell Telephone Laboratories. Already put to varied uses in the complex communications networks, the transistor has also aroused widespread interest throughout the radio and television industry, and several hearing aids employ transistors instead of vacuum tubes.

For all its insignificant appearance, the transistor does amazing things. It will serve as an amplifier or an oscillator, but one must look hard to find any other resemblance to the familiar vacuum tube now used to do these basic jobs.

Transistor's Extreme Simplicity

The transistor is rugged, has no vacuum, no grid, no plate, no cathode and, therefore, there is no warmup delay — it operates instantly. The first type to be announced, known as the point-contact transistor, consists of two thin wires resting on a tiny wafer of germanium and spaced only a few thousandths of an inch apart. The flow of current in one of the fine points controls the flow in the other point. Since transistors need no heater to supply electrons, they require very little power — less than a thousandth of that used by an ordinary flashlight.

Compared with the relatively slow development of vacuum tubes and other electronic devices, transistor development has been extremely swift. Bell Labs. now has nearly 40 experimental types, some of which foretell applications of the highest order of usefullness.

Shupert to ABC-Paramount

George T. Shupert has joined ABC-Paramount and will be in charge of film distribution for television. Mr. Shupert resigned as vice-president and general manager of United Artists Television Corporation to assume his new post.

New Canadian Theatres

A total of 40 new theatres have gone into operation in Canada so far this year. These include 17 new drive-ins and 23 standard houses. Theatres under construction total 38, including 22 drive-ins and 16 indoor houses. In the planning stage are about 20 drive-ins and 16 standard theatres.

What Price Chaos in Sound?

By THOMAS L. BURNSIDE

IS THE present uncertainty in the field of stereophonic sound acting as an effective brake on the motion picture industry's fitful movement towards prosperity via the technological route? A sampling of opinion by *International Projectionist* reveals a concensus that is definitely in the affirmative.

In the interim between the July issue of IP and the day this is written, the editorial department has had this problem raised in a dozen different ways — and from a dozen different questioners, including top manufacturers of sound equipment as well as exhibitors and working projectionists.

One informal group of engineers and projection experts met early this month on the problem and went so far as to circularize the major Hollywood studios seeking information. Specifically, they asked for company plans regarding types of sound tracks, the number of pictures planned, in the works and now completed using 3-track recording.

One top executive of a major manufacturing company in the stereophonic sound system field summed up the general thinking this way:

"Today," he said, "approximately 600 of the largest and best theatres in the United States and Canada are equipped with a stereophonic sound system and each week 15 or more theatres are added to the list.

Systems Are Alike

"No matter what the make or model of these stereophonic systems they are all alike in that they have three identical power amplifiers, three identical pre-amplifiers, three identical loud speaker systems, a number of auditorium speakers and one or two magnetic reproducers.

"These reproducers are designed to reproduce three 200-mil magnetically recorded sound tracks on a separate sound film. These reproducers are synchronized with the picture film by electrical interlock equipment.

"It has been proposed by one of the film producers, 20th Century-Fox, that theatre owners purchase stereophonic sound equipment that will reproduce three 50-mil and one 25-mil magnetic sound tracks recorded on the picture film itself.

"Obviously," the executive went on, "such a stereophonic system would require a different type of magnetic reproducer than the ones with which more than 600 theatres are now equipped.

"If theatres are to present Fox pictures they will need one kind of magnetic sound reproducer, and if they wish to play pictures of all other studios they will need the type presently installed in 600 theatres.

71 Pictures Ready

"While Fox will undoubtedly bring out some fine pictures recorded with stereophonic sound on the picture film, it would appear to be to the best interests of the exhibitors of the country to continue to install stereophonic sound systems with separate magnetic sound reproducers. There is a known early future supply of 71 pictures forthcoming from other studios which require stereophonic sound systems with separate magnetic reproducers.

"Insistance by Fox that their method is the only good one has caused a number of theatres to delay on the installation of stereophonic sound when they actually should be rushing to purchase a stereophonic sound system.

"Presentation of just a few of these great forthcoming pictures should produce profits that will not only pay for any small portion of current stereophonic sound systems that may become obsolete but they should go a long way towards paying for the entire system.

Quality of Sound

"Stereophonic sound, plus wide screen and 3-D, could well be the salvation of our nation's exhibitors and if there should be a long halt in installations of stereophonic sound it might never become the big box-office producer that is its potential.

"Projectionists who know about sound reproduction will be quicker than exhibitors in recognizing that the quality of sound reproduction from three 200-mil tracks will be vastly superior to sound reproduction from three 50-mil tracks. From the standpoint of quality of reproduction, a stereophonic sound system with a separate magnetic reproducer is a better piece of equipment than systems with the penthouse or button-on type.

"Projectionists will also realize that, whether the separate reproducer or the penthouse type become standard equipment, the theatre still needs *both* types of stereophonic systems if pictures from all Hollywood studios are to be played."

[*EDITOR'S NOTE: This issue of IP went to press before the 20th Century-Fox stereophonic system was unveiled to the press in New York. A full report on the Fox system will be presented in IP next month.*]

The Worm Turns—TV Fears Theatre Competition

For a long time theatre men have been complaining about competition from home television sets, but this month the situation was reversed. A television executive pulled out his crying towel and expressed the fear that film theatres were in a position to do serious damage to the Tv networks.

Theatre Tv, for which 110 theatres are now equipped, is potentially capable of blacking out all major sports events for sponsored television, it was asserted by Ted Leitzell, of the Zenith Radio Corp. at a New York press luncheon. He pointed out that the returns from theatre Tv easily could, as it is extended to more and more theatres, return a far greater revenue than is possible via sponsored video. "Even the largest advertiser could not compete," he said.

At the same luncheon Dr. Millard C. Faught, economic consultant to Zenith and a long-time proponent of "Phonevision," a system of collecting fees from home viewers for high-quality television shows, stated that he believed the FCC will "cooperate with the inevitable" and authorize some system of boxoffice television for home listeners within a year.

Advertising revenue is not sufficient to bear the whole burden of high-quality television programs, and the markets of some television stations are so small that they cannot be supported by advertising alone, he said.

Outline of 16-mm Projection

Presenting some comments on the history and operation of 16-mm projectors, abstracted from a very complete text-book on the subject.*

V

WHEN a room is used frequently for projection, it will pay to obtain expert advice on the best manner to treat it acoustically. Manufacturers of sound insulation materials such as Johns-Manville maintain staffs for the purpose of advising prospective users on how to get the best results per dollar invested.

Two Simple Rules Cited

There are two simple rules that will aid sound reproduction materially:

(1) There should be no obstruction between the mouth of the loudspeaker and the ears of each listener in the audience. This is best accomplished by elevating the loudspeaker above the heads of the audience; in this position there will be least obstruction by the heads of persons in the forward portion of the audience.

A location that is suitable is at the top center of the screen with the loudspeaker mouth pointing at the center of the audience. In 35-mm entertainment theatres, a perforated screen is used with the loudspeaker behind it at approximately 2/3 screen height. Although this is a good arrangement, perforated screens are rarely used for 16-mm projection because of the light loss of a perforated screen. Another good loudspeaker location is on a stand at the side of the screen with the center of the horn mouth located at about 2/3 screen height and "pointed" at the center of the audience. In placing the loudspeaker, it should be remembered that when a loudspeaker is not along a line of sight the listener cannot hear it properly.

(2) In the acoustical arrangement of a room, parallel hard surfaces should be avoided by coating one surface of each pair with some kind of absorbent material.

In a room with an audience, it is more important to cover that part of the ceiling under which no one sits rather than the part under which the audience is located. Likewise, in arranging drapes and hangings on the walls, it is not necessary to cover a wall area directly opposite drapes used over windows. In general, parallel surfaces are best controlled by covering only one of the pair of surfaces. In the case of parallel side walls, for example, one wall might alternate with a standard width of wallboard running from floor to ceiling, and no covering for the same width. The opposite wall would likewise alternate except that a covered portion of the first wall would be directly opposite an uncovered portion of the second wall, and vice versa. The rear wall should be almost completely covered if possible.

Practical Projector Performance

A good 16-mm sound projector should provide a very steady, sharply focused picture that is evenly illuminated, together with clear, steady, unwavering, undistorted, naturally reproduced sound. It is reasonable to expect this performance not only at the beginning of the first reel projected with the machine, but also throughout each and every reel to be projected. Ordinarily, if a machine provides such performance when new, its performance does not deteriorate suddenly. An effect common to all machines is that the picture focus adjustment changes as the machine heats up, making slight focus readjustment necessary during projection if the mechanism is used for several consecutive reels.

A good projector should be expected to produce minimum film damage and wear and tear. Library-circulated prints are expected to provide from 50 showings upward before they are discarded; each user of a machine is morally bound to make certain that his equipment does not mutilate the film; the 50th user has as much right to a satisfactory showing as the first.

Maximum Number of Runs

Some well-known machines are "very hard on film," while the others are "easy on film." If a loop of film is made up that will run continuously in a projector, that loop should run at least 750 times without evidence of scratching or damage; it should show no injury to sprocket holes, to the picture area, or to the sound track area. Better grade projectors can ordinarily run such a loop 3000 times; and in a series of tests at the Bureau of Standards just before World War II, one proved capable of cycling a loop 5200 times without damage.

In the same Bureau of Standards test, a well-known machine with some of the very best features, failed because it proved destructive to film. The maximum life of a test loop obtained with this machine was 700 times, a minimum of about 50 times and an average life of about 100 times. Such destructiveness is a very serious matter despite a machine's technical excellence otherwise.

[THE END]

* Cond. from "16-mm Sound Motion Pictures," by W. H. Offenhauster, Jr., published by Interscience Publishers, Inc., New York.

16-mm Films Booming in Educational Field

Attendance at movies is booming, at least in the 16-mm field, according to a survey report presented to the National Audio-Visual Association's annual convention just concluded in Chicago.

More than 100,000 16-mm projectors are now in use in schools, the convention was told, with many thousands more in operation as part of the educational programs of trade unions, churches, fraternal organizations and women's clubs.

Industry, the survey showed, is by far the largest user of 16-mm equipment. In addition to purchasing or renting professionally produced films for advertising, sales promotion, public relations and other purposes, including safety campaigns, many business firms maintain audio visual departments to film in-plant movies for training employees and for efficiency studies.

Altec Cuts Stereo Costs

Altec Service Corp. announced that a new schedule of stereophonic sound installation costs, involving appreciable reductions is now in effect for theatres throughout the country. Installation prices now run from $375 for smaller capacity theatres to a maximum charge of $750 for larger houses. The reduction exceeds $200 in some cases.

The company also reports that it is continuing a rapid expansion of its engineering and service staff to cope with the growing schedule of stereosound installations, which is expected to mount to 50 per week by Sept. 1.

Altec is continuing to hold stereosound clinics and forums in conjunction with CinemaScope demonstrations in key cities throughout the country. The 8th and 9th clinics were held in San Francisco and Seattle last month.

Seen at the Chicago opening of Cinerama are, left to right, Walter Thompson, assistant general manager in charge of technical services and producer of Cinerama's prologue; Gene Atkinson, business manager of Projectionists' Local No. 110; Lowell Thomas, Cinerama's president and narrator, and Lester B. Isaac, general manager of theatre operations.

CINERAMA

Moves to the

MEZZANINE

IT'S HARD to believe that the revolution in the film industry began, so far as the box office is concerned, less than one year ago. On September 30, 1952, to be exact!

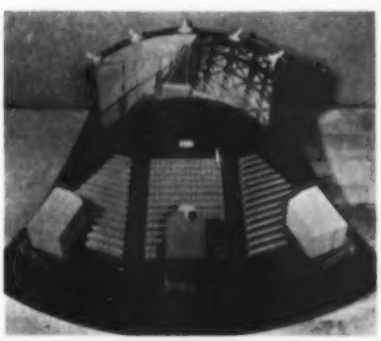
On that date "This is Cinerama," first of the startling innovations to hit the public in a big way since "The Jazz Singer" exploded on the industry back in 1927, opened in New York and started the movie business on the merriest roller coaster ride in its history.

Now Cinerama, in its newest installation — in Eitel's Palace Theatre, on LaSalle St. in Chicago's Loop — has broken with its own tradition.

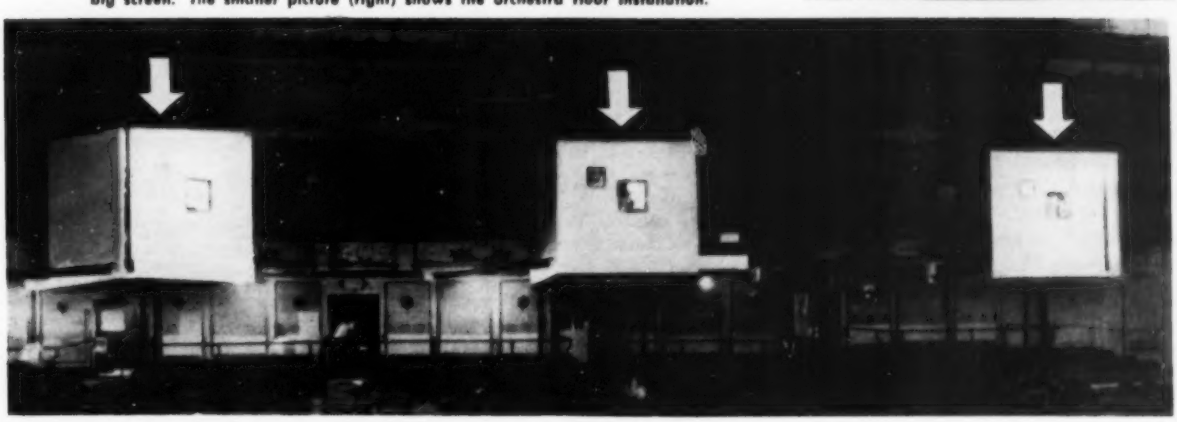
The battery of three projection machines has been lifted from the orchestra floor where, as in New York, Los Angeles and Detroit, the trio of specially built projection rooms occupied valuable seating space. At the Palace, engineers have suspended the booths between the mezzanine and the balcony floors, resulting in improved projection because the suspended position completely eliminates bothersome vertical pitch. The center of the lens more nearly approximates the center of the screen than in other Cinerama theatres. Too, access to the machines is much easier.

With box office business booming (blocks of tickets have been sold for dates well into 1954), Lester B. Isaac, Cinerama's general manager for theatre operations, paid glowing tribute to the members of Local 110, the Chicago projectionists Local of the IA, and to the business manager, Gene Atkinson.

"We have had fine cooperation from Gene Atkinson and the membership of Local 110," Mr. Isaac said. "They have given us a wonderfully smooth operation. They were eager to learn and to help during the preparatory stages. They are giving our performances the real polish and perfection so essential to the success of Cinerama."



Cinerama's Chicago installation (below) raises projection equipment from the auditorium floor, as in New York, Los Angeles and Detroit, and suspends the three specially built rooms between the balcony and the mezzanine (arrows), thus eliminating vertical pitch. The center of the lenses is more on a line with the center of the big screen. The smaller picture (right) shows the orchestra floor installation.



IN THE
SPOTLIGHT

REPRESENTING 15 West Coast Locals, the IA recently submitted formal demands for a new basic agreement to the Association of Motion Picture Producers. Included in the proposals submitted are (1) pay increases from 10 percent to 15 percent; (2) that Locals receive 5 percent of the revenue derived from all re-issues and from theatrical movies shown on Tv, and (3) that producers shall contribute 25c per hour to the Locals' pension funds. It was also proposed that the producers contribute 3 percent of the gross payroll to the Health and Welfare Plan in place of the present contribution of 5 cents per hour.

Negotiations will open on September 8 with IA Representative Roy Brewer representing the Locals, and Charles Boren negotiating for the AMPP.

• Mrs. Gertrude Gompers, widow of Samuel Gompers, founder and for many years president of the AFL, died August 1 in her home in New York City. Mrs. Gompers was 70 years old and had been ailing for the past year.

• Tv technicians of the Canadian Broadcasting Company recently voted in favor of the IATSE as their bargaining representative in a hotly contested jurisdictional dispute with NABET (National Association of Broadcast Engineers and Technicians). *(See IP for May, 1953, page 16.)* Technicians affected by the election are employed in broadcasting studios in Montreal, Toronto, and Ottawa.

• Harold J. Germann, member of Local 352, Springfield, Ohio, was highly commended by Police Chief Lawrence A. Abbott and other civic leaders for a traffic safety film he produced and photographed for the Springfield police department. The film runs about 25 minutes and stresses the importance of obeying traffic regulations. The scenes are so realistically portrayed that during the filming of an accident investigation a passerby telephoned the police department to report an "accident." A commentary script was written for the movie and it is now available to schools, clubs and other interested groups.

Germann is chief projectionist at the Regent Theatre in Springfield, having worked there for the past 37 years. Taking motion pictures, both 16- and 35-mm, has long been a hobby of Germann's and he is very well known in the short subject field.

• D. R. Barneclo, secretary-business representative for Indianapolis Local 30, was unanimously re-elected secretary-treasurer for District No. 8 (Kentucky, Indiana, Michigan and Ohio) at the District's recent 45th convention held at the Commodore Perry Hotel in Toledo, Ohio. IA Representative John B. Fitzgerald presided at the meeting.

Many problems were discussed by the delegates, with particular emphasis being placed on the various wide-screen and 3-D projection techniques. Drive-in theatres also came in for a good share of the discussions and ways and means of organizing them were taken up. A donation of $100 to the Will Rogers Memorial Hospital was voted by the delegates.

A resolution was passed honoring the memory of the late IA Assistant President Thomas J. Shea.

• The members of Laboratory Technicians Local 702, New York City, ratified a new two-year agreement with the Eastern laboratories, providing for an *overall* increase of 11¼ per cent. The contract is retroactive to June 17

Next Month in IP!

WHAT'S a stroboscope? What is an anamorphic lens? When the Chicago Cubs pull a "squeeze play" everybody from the bat boy to the projectionist in the Bijou knows what they're up to — but when a Hollywood cameraman pulls an optical squeeze play for CinemaScope that's another story. Read all about it in September's *International Projectionist* when . . .

Henry Kogel, staff engineer of the Society of Motion Picture and Television Engineers, defines some of the puzzlers that plague projectionists when they wade through articles in IP.

Robert Mitchell, IP's expert on such things, follows up his piece in this month's issue with a penetrating discussion of stereoscopic projection processes. Mr. Mitchell has another article coming up in October, too.

With Color Television in the offing, to give more jitters to an industry already with the shakes from the 3-D't's, IP is set for September with a study of Color Tv — with the stress on technique and some remarks on its probable effect on the projection business.

Theatre Tv, too, looms important economically, not only to the men who own theatres, but to the men who throw the fights on the screen as well. IP will have a story on that, too.

Will 3-D drive people blind — as well as batty? Or is it the answer to the eye-doctor's prayer? September's IP has something to say on the effects of the new medium on the health of the millions who, we hope, will flock into the theatres.

Also, Tom Burnside of IP's editorial staff, will follow through with an article on the CinemaScope magnetic sound track on film. This system, in conflict with the type now installed in hundreds of key theatres, has the industry excited. You'll know all about it when you read September's issue.

Because IP is the projectionists' magazine, all of these articles — and others, too — will be tailored to your particular needs. If you haven't subscribed as yet, get your subscription in at once — and get your projection room partners to subscribe. You'll want to keep a file.

last and gives the members a wage boost of 7½ per cent for a 40-hour work week. In addition, the laboratories will contribute 7½ cents per hour into the Local's welfare fund, while each employee will contribute 5 cents per hour.

• Deon DeTitta, member of New York Local 306 and chief projectionist for 20th Century-Fox for many years, retired last month after 37 years with the company. His association with the old Fox Film Corp. began back in 1916 when he ran pictures for William Fox in the company offices on West 46 Street, N. Y. C., later moving on to the company's new headquarters on West 56 Street, where he operated one of the six preview projection rooms.

• Several months ago, Boston Local 182 was enjoined from picketing two drive-in theatres as a result of a suit brought against the State commissioner of public safety by a group of independent exhibitors who sought to effect a one-man projection shift in direct defiance of a ruling set up by the Massachusetts Department of Public Safety, to wit:

When more than one cinematograph or similar apparatus involving the use of a combustible film more than ten inches in length is used for the continuous exhibition of motion pictures, there shall be two licensed operators in attendance in the booth or enclosure. When only one licensed operator is in attendance, it will be necessary to "black-out" during the process of changing over. While exhibiting motion pictures the operator shall devote his entire time and attention to that work, and shall not leave the operating side of the machine while it is in motion.

The decision of the presiding judge that the above regulation was "invalid, void, and unenforceable," was appealed by the State commissioner, and there the matter rests until the appeal is heard. The importance of this case cannot be minimized for its final disposal may have far-reaching repercussions affecting the welfare of the projectionist craft throughout the entire country.

25 Years Ago — August 1928

• Resolution No. 38 adopted. IA Monthly Bulletin to publish names and addresses of District secretaries . . . Wm. F. Green, president of the AFL appealed to IA President Canavan to urge all IA Locals in the state of Minnesota to campaign for the re-election of U. S. Senator Henrik Shipstead, whose "legislative record on measures of interest to labor is 100 per cent." The appeal was published in the IA Bulletin with a recommendation that Minnesota Locals lend their support to the Senator. . . . IA President Canavan urged all Local wage-scale committees engaged in negotiating new contracts to continue with such negotiations as long as there is any hope of reaching an amicable settlement, and to try to avert strikes whenever possible. . . . Local No. 90, Stockton, Calif., gave a banquet in honor of Grover A. Grider, member of the Local, who was elected mayor of Stockton. . . . John Wines, charter member of Local 100, Parkersburg, W. Va., was killed while running an electric drill which came in contact with a heavily charged electric wire. . . . The death of one of America's foremost actors and a friend of organized labor, Robert B. Mantell, was mourned by the members of Local 42, Omaha, Nebr., who recalled the service he rendered the Local by refusing to play a one-week engagement at the Brandeis Theatre in that city when they were on strike. This action of Mr. Mantell speeded up a settlement between the Local and the theatre management, and in appreciation Local 42 presented him with a gold life membership card. This, Mr. Mantell, stated publicly, was one of his most prized possessions.

• The mid-summer meeting of the IA General Executive Board will be held at the home offices in New York City on August 24.

• The late Emil E. Behr, member of Milwaukee Local 164, who died last month, had a very interesting career in his younger days. Back in the 1880's he was a member of a boy's juvenile band that played at GAR conventions in Washington, D. C., Milwaukee and St. Louis, later hitchhiking through Colorado and Texas where he joined the Rogers and Costello wagon show and circus. He spent several years traveling with a minstrel show that played in every state east of the Mississippi River. He worked with showboats, carnivals and orchestras until 1909, and in 1910 when he was in Hot Springs, Ark., he ran a number of the early motion pictures. He then went on to Milwaukee where he opened the Lisbon Theatre, later working in various picture houses in the state of Wisconsin.

A discussion of 3-D projection by Merle Chamberlin (center) projection supervisor for M-G-M Studios, Culver City, Calif., was the highlight of the recent 6th District Convention. Seated at left is IA Representative E. J. Miller, who is also business representative for Houston Local 279, and at right is Al Johnstone, member of New Orleans Local 293, 6th District Convention chairman.

Motiograph Stereosound Installed

Motiograph stereophonic sound has been installed in West Virginia's largest theatre, the Kearse, in Charleston. Other installations in the area include the Freeman at Northfork, the Grand at War, Ritz at Hinton, and Plaza at White Sulphur, W. Va.

Also announced by Motiograph was the installation of stereosound at the Yorktown and Fairmount theatres in Cleveland, Ohio.

By Sept. 30, Motiograph expects to have completed delivery of over 100 stereophonic sound systems with one or two separate magnetic reproducers. These installations and those made by other equipment companies will then show over 600 theatres so equipped, Motiograph estimates.

Pension Protection — Goal of Labor

Foremost in the minds of Labor men these days is adequate pension protection, a topic which has generated intense interest in IA ranks for many years past. This is the second in a series of articles which reflects the official view of the AFL.

II

FACED with the choice, one union may properly decide that a pension plan would be a desirable immediate objective. Another may feel that its members cannot at present afford to divert any part of their potential wage gains into a pension fund.

In considering this issue, certain facts should be borne in mind. Pension funds are designed to serve but a single major purpose: to help meet the need for an assured income after a person's working life is over. Depending upon the person's present age, that particular contingency may be relatively remote as compared with other more pressing ones.

Need For Liquid Cash

In contrast, a wage increase can be used for any number of purposes. It may be added to savings or used to provide an immediate higher standard of living. As liquid savings it will be available for other urgent needs as well as that of old age — the education of one's children, medical expenses, living expenses during unemployment, payments on a house, or anything else that chance or choice might require.

In extreme cases, the answer should be fairly obvious. Where the wage scale of a particular group of workers is at or near the bare subsistence level — or too low to provide decent food, clothing, housing or medical care — wage increases should be the first order of business.

Even though the problems of the aging in such a group are very serious, to sacrifice a possible wage increase in order to set up an expensive private pension plan would leave that group "insurance poor." This is one of the many reasons why private retirement plans can *never* meet the broad national problem of old age insecurity. The Federal Social Security system is the only practical means of solving that large problem.

While limited to one main function, a well-constructed pension plan performs that particular function very well. There are many groups, therefore, that may derive substantial advantages from the negotiation of a sound retirement plan.

Protects Living Standards

This might be true, for example, in the case of a union whose members enjoy a scale of wages high enough to provide a margin of economic safety after immediate needs have been met. For such a group, Social Security alone — plus what they may have been able to set aside individually — may mean too sharp a drop in their accustomed standard of living after retirement.

While a good pension plan is certainly not one of the cheaper things in life, the benefits which the individual member stands to get out of a group plan are much higher than he could possibly provide for himself if he were to set aside his pro-rated share of the cost of the plan in the form of individual savings. Of course, in return for this chance of higher benefits, he runs the chance of never getting anything back out of the fund at all.

Like a lottery or a baseball pool, some of the participants must lose out, if others are to get out of it what they expect. A member pays for the assurance that if he does live until retirement, and meets any other qualifications that might be written into the plan, he will receive a guaranteed income for the rest of his life.

The relatively high benefits, in relation to the per capita cost, of a pension plan are made possible through tax savings and interest earnings on the funds held in reserve, and through the operation of the law of averages which will apply where the plan covers a substantial number of members.

Pooled Risks, Pooled Benefits

By negotiating these plans through collective bargaining, workers can pool their respective risks and resources so as to take advantage of the law of average and the economics of group participation, to provide those who qualify under the plan with a higher retirement income, at a lower cost, than they could otherwise obtain. They can spread this cost in a systematic and relatively convenient way over the span of their working and earning lives. In short, they can obtain benefits as a group which would be beyond their reach as *individuals*.

As the older men retire, new job opportunities are opened up. In slack times, the retirement of older workers may save the jobs of younger men who would otherwise be laid off. The retirement problem is therefore related to the broader problem of keeping *involuntary* unemployment at a minimum.

Pensions and Income Tax

A very important point with regard to pension plans is the fact that under the regulations of the Bureau of Internal Revenue, employer contributions to a pension fund ar not counted as a part of the employee's wages for the purpose of the withholding or income tax at the time these contributions are made. The employee does not have to pay any income tax on these amounts until he actually retires and begins to receive the pension.

At that time, the portion of his actual pension which is derived from employer contributions is counted as income and taxed accordingly. However, the employee will not have to pay a tax on his pension unless his total income, including the pension, after retirement is high enough to put him in a taxable bracket.

Provided the plan is approved by the Bureau of Internal Revenue, the employer derives a substantial tax benefit from his contributions to a pension fund. These contributions are regarded as a cost of doing business and the employer may deduct the full amount from his taxable income, even though these contributions to the fund are in excess of the amount actually being currently paid out of the fund in the form of pensions. The interest income earned by an approved fund through the investment of its reserves is likewise exempt from taxation.

[TO BE CONTINUED]

3-D Projection Faults

Dr. Elkan R. Blout, research director of the Polaroid Corp., reports that 75% of the theatres checked in a survey just completed presented 3-D pictures perfectly, but in over 20% of the theatres some projection faults were noted. The most common difficulties discovered were:

1. Faulty synchronization.
2. Lack of consistant inspection of the screen to check framing, synchronization and focus of the projected images.
3. Prints mismatched during splicing. When a splice was made, exactly the same number of sprocket holes was not accounted for, resulting in mismatched images.
4. Unevenly matched light intensities of the two projected images. This may be due to a difference in the tone of the two paired prints, but is more often caused by the light from one projector being brighter than its mate.
5. Improperly positioned projection filters. The axis of polarization must be precise so as to match the axis of viewers worn by the audience. Out-of-position filters can do as much damage as an out-of-focus lens position.

To the Editor of IP:

Your editorial suggestion (IP for July, 1953, page 3) is an excellent idea, and I offer my pioneering efforts dating back to 1913. I have seen early attempts at the so-called 3-D, and I can assure you that none of the present methods have new or fundamental physical (optical) ideas that haven't been recommended and tried before (better than 25 years ago), for both still and motion pictures, in black-and-white as well as in colors.

I actually built a "wide-screen" camera and a projector as early as 1920, using 17½-mm merely by modifying the 35-mm *picture gate*, applied for U. S. patents and subsequently abandoned it because of lack of financial cooperation. By means of this system I was able to get the benefits of a sound track used in a 35-mm projector with a small picture frame, and, at the same time gave rise to the now so-called wide-screen effect.

This idea was termed as a "sub-standard" system, and at a later time it was tried in England. The results were indeed excellent (on the screen), but the industry would not accept it at the time. Other modifications were as by optical means and accomplishing the same result, but that soon introduced new technical difficulties — too many to review in this limited space.

SAMUEL WEIN
98 Bigelow Street
Quincy, Mass.

To the editor of IP:

Thumbing through the July issue of our favorite trade journal, IP, we read an article entitled "Water Cooling for Projection Carbons — What Are the Facts?" And we are still wondering what the "facts" are because we don't recall seeing any in the article.

We have been under the impression that this is August, 1953 — not 1949! It seems rather odd for anyone to imagine that the whole motion picture industry should cling to the policy of turning out the same old lamp, cooler, or what have you, year after year without any thought of improving the product. Of course we aren't located in a technological vacuum out here on the West Coast. We even have the idea that we're rather progressive.

We do manufacture Hydro Carbon Coolers for projection arc lamps — and we insist that our product does not resemble the "screw-on" devices referred to in the July issue of IP as having been studied by Messrs. Jones, Bowditch and Finkelnburg. Our product does not resemble this device in either size, shape or efficiency. In any case, doesn't it seem rather futile to relate 1949 tests to a 1953 product?

As for how to get more light, we're perfectly willing to let our Hydro Carbon Cooler speak for itself. Seeing is believing!

As for cooler operation, we dare anyone after a twenty-minute run to remove the positive carbon bare-handed from any arc projector not equipped with a carbon cooler. To those who don't believe that carbon cooling makes any difference, ask any projectionist who works with one.

In answer to the question "Why slower carbon consumption?" any theatre operator can tell you that the less carbon consumed the lower his operating expenses.

We'll frankly admit that Hydro Carbon Coolers are not essential to 3-D projection. Neither is an arc lamp, if you come right down to cases. It is possible, we suppose, to show a 3-D picture using a couple of flash lights. We doubt, however, that results would be very satisfactory.

HAL HUFF
Hal I. Huff Mfg. Co.
Los Angeles 7, Calif.

Polaroid's Device Keeps 3-D in Sync

TWO new devices developed by the Polaroid Corp. to enable projectionists to correct troublesome "out-of-sync" conditions in 3-D showings were demonstrated this month at an informal meeting of technical executives of the various motion picture companies held at Warner Bros.' home office projection room in New York.

The two synchronization monitors, which make it possible to maintain perfect sync at all times during a 3-D showing, were demonstrated by L. W. Chubb, senior research engineer for Polaroid, who reported to the meeting that a survey of some 70 theatres, mostly in the New England area, indicated that 20 per cent or more of 3-D showings were out of sync to a sufficient degree to cause discomfort to the audience.

Mr. Chubb demonstrated an electronic synchronization monitor, which provides an automatic warning for any mis-synchronization up to four frames, and a cheaper and more compact stroboscopic model which scans the screen and indicates by a break in its line pattern any partial frame out-of-sync condition. Both monitors are accurate to one-tenth of a frame. Beyond one frame, it was demonstrated at the meeting, "out-of-sync" can be detected by the trained eye of the projectionist.

Synchronization control devices, to rectify out-of-sync conditions once they are discovered with the aid of the monitor, were also demonstrated by Polaroid. These devices are particularly helpful because they enable the trouble to be corrected while the film is being shown, something not possible until now.

When the selsyn interlock is used for 3-D, two types of sync control can be employed: one is a differential selsyn between the two existing selsyns, and the other a multiple snap switch inserted between the selsyns with steps equivalent to 1/10th of a frame variance at each interval. For mechanical interlocks, a mechanical differential has been developed.

It was announced that pilot quantities of the Polaroid Corp. devices would be available this month, with the strobascopic synchronization monitor and control device available together for a price estimated at less than $100. These devices are expected to be widely used because at present it is possible for 3-D films to get slightly out of sync during a showing despite the best efforts of projectionists and the best equipment.

The meeting at which the 3-D monitoring devices were demonstrated was the second in a series of informal gatherings under the chairmanship of Frank E. Cahill, Jr., of Warner Bros. Purpose of the meetings is to discuss the problems of the new techniques from the point of view of the projectionist and aid him in handling new equipment.

Among those participating in the first two meetings were: J. J. Kohler and M. D. O'Brien, of Loew's, Inc.; Harry Rubin, of United Paramount Theatres; Charles Horstman, RKO Theatres; H. H. Heacock, A. J. Platt and J. F. O'Brien, RCA; C. J. Bachman, Henry A. Eberle and C. A. Piltz, Stanley Warner; L. W. Davee, Century Projector Corp.; William Hecht, International Projector Corp.; J. R. Johnstone and P. D. Ries, National Carbon Co.; Boyce Nemec and Allen P. Snody, SMPTE; A. J. Rademacher and Elmer Wilschke, Altec Service Corp.; G. F. Sandore, of RCA Service Co.; J. W. Servies and John Currie, National Theatre Supply, and Basil Wedmore, of Westrex Corp.

STEREOSCOPIC PROJECTION AND PHOTOGRAPHY

(Continued from page 8)

outside mirrors from each other is increased, depth is greatly exaggerated as one looks into the two inside mirrors.

This apparatus may be simplified by building only one half of it, using one inside and one outside mirror. One eye will then look directly at a scene, while the other eye receives its image by reflection from the two mirrors. It will probably be necessary to adjust the tilt and angle of the mirrors quite a bit in order to obtain the best results.

It is of interest to note that the interocular distance of many prism binoculars is greater than the interocular distance of the eyes. But because binoculars act like telephoto lenses in a camera, there is no increase in stereopsis. In fact, depth is lost because of the long focal length of the objective lenses.

3-D with a Box Camera

Readers who have ordinary box cameras can easily take real 3-D pictures which may be viewed through an old-fashioned stereoscope. Fasten a small flat table-board to a camera tripod. At each end of the table-board, on its upper surface, place a "guide strip" of wood or other material for the side of the camera to "bring up" against. If correctly put together, the two guide strips will be parallel to one another, and will permit the camera to be shifted laterally from one end of the board to the other by about 4 inches.

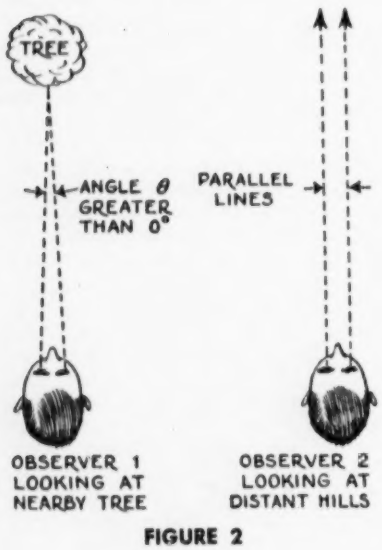


FIGURE 2

Place the camera on the table-board and bring it up firmly against the left-hand edge-guide. Snap the left-eye picture. Roll the film down to the next exposure, shift the camera laterally so that it brings up against the right-hand guide-strip, and snap the right-eye picture.

Because it takes a moment or two to roll down the snapshot film and to slide the camera over, there should be no movement in the subject between exposures.

Line Up Photos

When the paper contact prints are made, determine which are the left and right pictures. (Foreground objects are displaced to the right, relative to the background, in the left-eye picture, and *vice versa.*) Then cut the pictures to size (from 3 to 3¼ inches wide) and paste them on cardboard the size of a stereogram card (3½ by 7 inches). To line up the photos, be sure that identical objects in the two pictures have the same height from the bottom edge of the card, and are separated laterally by exactly 3¼ inches in the case of the *most distant* background details.

With the snapshot-camera rig described above, it is possible to perform a number of "tricks" with 3-D, including double-exposures, trick printing and "paste-ons," vastly increased interocular distances, unusual camera angles, etc.

Stereo Composition

But right at this point it is well for us to realize that a stereophoto of a distant landscape, no matter how beautiful, is stereoscopically a dud unless foreground objects have been included in the composition of the picture. Many of the most thrilling and awe-inspiring sights in nature do not depend upon stereopsis for their effectiveness. The scenery in the Rocky Mountains or at Grand Canyon is so overwhelmingly magnificent that it is difficult for us, at first thought, to realize that it is no more stereoscopic than similar scenery reproduced on the regular "2-D" movie screen. Distant mountains and deep canyons — in fact *all* scenery farther away than 900 or 1000 feet from an observer — are obsolutely "flat" as perceived by human vision.

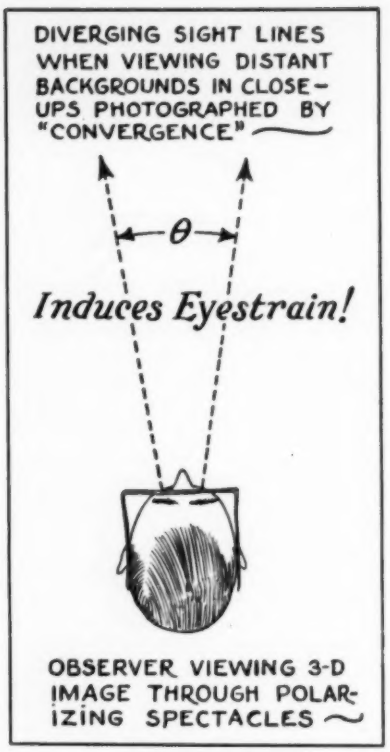

DIVERGING SIGHT LINES WHEN VIEWING DISTANT BACKGROUNDS IN CLOSE-UPS PHOTOGRAPHED BY "CONVERGENCE"
θ
Induces Eyestrain!
OBSERVER VIEWING 3-D IMAGE THROUGH POLARIZING SPECTACLES

FIGURE 3

Amateur photographers can prove this to their satisfaction on their next mountain-climbing expedition or trip to the Grand Canyon. Take two sets of stereophotos of each scene of nature's grandeur, one set including a foreground object in each stereophoto — rock, tree, or person — and the other having no foreground within range of the camera.

Foreground Objects

On examining the pictures through a stereoscopic viewer, it will be found that stereoscopic depth appears only in that set of photographs which includes foreground objects. The distant mountains appear as flat as scenery on a theatrical backdrop; and only the foreground provides the stereoscopic depth.

The set of photos in which foregrounds are absent could be duplicated exactly by non-stereoscopic photos, using identical prints for the left and right pictures. The only impression we get from looking at them is the feeling of an indefinitely great distance, but no stereoscopic depth.

The impression of both distance and depth can easily be obtained in conventional "flat" movies, as we have said, by dolly shots in which the ap-

parent movement of foreground objects serves to orient the mind of the observer toward an impression of actual space. The uncanny ability of ordinary movies to provide pseudo-stereopsis is well illustrated by films photographed from speeding railway trains and automobiles, diving airplanes, etc. The roller-coaster sequences in Cinerama's spectacular exhibition were no less effective for the lack of true stereoscopy.

Convergence Explained

The term "convergence" in stereophotography refers to the "converging" of the two lenses (or diagonal mirrors) of a stereocamera upon a chosen foreground subject. Instead of aiming straight ahead, the two optical axes of the camera "point in" and intersect at the selected foreground subject. It is probably the very worst technique ever to afflict theatre movies.

To make the matter of convergence clear, let us see what happens when we look at near and distant objects in real life and in a stereoscopic photograph.

Suppose we look at a nearby tree. Our eyeballs turn toward each other very slightly so that the optical axes of our two eyes converge upon the tree, meeting there to form an angle. Now suppose we look past the tree to a distant object — a mountain. Our eyes now turn so that their optical axes are practically parallel to each other. The parallax-angle is now almost nonexistent.

When we look at the tree, the mountain-background is only a double-imaged blur. And when we look at the mountain, the tree-foreground is likewise a double-imaged blur.

Viewer's Eyes Converge

Assume that we have made a stereogram of this scene — nearby tree and distant mountain — and that we ex-

(Continued on page 28)

IA ELECTION

LOCAL 182, BOSTON, MASS.

Joseph Nuzzolo, Sr., *pres.*; Ralph S. Frazier, *vice-pres.*; Jack Rosenberg, *treas.*; Wm. H. Lawler, *fin.-sec.*; James M. Gibbons, *rec.-sec.*; Walter F. Diehl, *bus. rep.*; Charles E. Jandrue, Morris A. Goldman, Henry Gleken, *exec. board*; Guy Ruggerio, Leon A. Narbut, *trustees*; Patrick Kelly, Henry Perry, Alex Tradd, Fred S. Jones, and Albert I. Goldman, *seniority board*.

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Strong's 'Super 135' Is Designed for 3-D

The Strong Electric Corp. is now in production on a new arclamp, known as the "Super 135," designed to meet the demand for a greatly increased volume of light in 3-D and wide screen projection. The company also has available equipment for converting the familiar Strong "Mighty 90" lamp to utilize 2 new carbon trims which provide greatly increased illumination.

A feature of the new "Super 135," according to the company, is the Strong Infra-Ban Beam-Cooler unit which permits large increase in light without a corresponding increase in heat at the aperture. This filter device deflects the ultra-violet heat rays of that arc away from the aperture and back into the lamphouse from which heat is withdrawn through the stack by a mechanically induced air flow.

Accommodating a 20-inch carbon, the "Super 135" can burn the 10-mm Hitex carbon at 120 amperes for a full hour as required by the 5,000-foot 3-D film reels. Lamps which accommodate only 14-inch carbons can operate at this amperage no longer than 48 minutes without retrimming.

The position of the positive arc crater at the exact focal point of the reflector is automatically maintained without manual adjustment by means of the Strong Bi-Metal Lightronic tube which governs the speed of the motors that advance the carbons. Another feature of the lamp is unit construction, whereby the various components are easily removable so that the lamp can be adapted to future developments in carbons or burning techniques.

Strong also announces new equipment to raise the amperage of the "Mighty 90." With the proper combinations of negative heads, positive drive motors, carbon contracts and carbon drive roller sets, the company claims that the 11-mm regular uncoated carbon can be burned to 120 amperes, and the new 10-mm Hitex carbon or equivalent can be burned to 135 amperes. It is further claimed that approximately 25% more illumination can be obtained at 135 amperes with the 10-mm Hitex than with the 10-mm regular at 105 amperes.

Necessary parts required to burn any of these carbon trims can be supplied either as original equipment on new lamps or as conversion parts for field installation in older lamps. Further information of the new "Super 135" lamp or on the conversion parts for the "Mighty 90" may be obtained by writing to Strong Electric Corp., 31 City Park Ave., Toledo 2, Ohio.

TESMA-TOA Equipment Show

Interest in the new film techniques and the great volume of new equipment now going on the market is expected to draw a record attendance to the Fall trade show of the Theatre Equipment and Supply Manufacturers' Association, scheduled to begin October 31 at the Conrad Hilton Hotel in Chicago. The Theatre Owners of America will also participate.

More than 100 booths have already been reserved although the show is more than 2 months away, according to Roy Boomer, secretary of TESMA. He also stated that an open forum will be held during the conventions of the two organizations to discuss standardization and the future possibilities of the new processes.

Copper Drippings Salvage Ends

Lifting of controls on the use of copper and general easing of the copper supply situation has removed the primary motive for the Copper Drippings Salvage Program which was initiated in 1951 by the National Production Authority to aid the defense effort. In announcing the end of the program, the Authority thanked theatre projectionists, film carriers, exhibitors, trade journals and others in the industry whose co operation was largely responsible for the success of the program.

The first small portable "hand" camera was made in 1855 by B. J. Edwards.

the man with 200 brainpower*

ALTEC SERVICE CORPORATION has more than 200 engineers actively engaged in the servicing of motion picture projection and sound equipment and the investigation of every new projection and sound technique including theatre television. Their knowledge of new equipment and improved servicing techniques is checked at Altec's laboratories and distributed to every Altec Service Man. This circulation of information provides your local Altec Service Man with the useful experience and knowledge of more than 200 fellow engineers. His warehouse of knowledge is your assurance of the right service at the lowest practical cost.

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OBITUARIES

F. Earl Wright, 63, member of Projectionist Local 433, Davenport, Iowa, Rock Island and Moline, Ill., died June 27 shortly after undergoing an emergency operation. Wright served Local 433 in various official capacities, and up to the time of his death had been employed at the Capitol Theatre in Davenport, a position he held for the past 27 years. For many years he represented his Local as delegate to the Tri-City Federation of Labor and to the Iowa State Federation of Labor Conventions.

Funeral services were conducted by the Masonic lodge of which he was a member. He is survived by his wife and six children.

Emil E. Behr, 79, member of Milwaukee Local 164 since 1911, died July 23. Although he retired from all craft activities in 1944, Emil Behr continued his membership in the Local to the day of his death. He was a gentle, kindly man who had the esteem and affection of his brother craftsmen, and his passing will be mourned by his many friends in the industry. Survivors are two sisters and two brothers, one of whom, Walter A., is vice-president of Local 164.

Jack Austin Ayre, 54, member of Local 461, St. Catherines, Ont., Canada, died July 5. He was very well known in projection circles in North Ontario, having worked at the craft for the past 36 years.

Clyde H. Austin, member of Local 321, Tampa, Fla., died last month after a short illness. For the past 27 years Austin, who was only 54 at the time of his death, worked at the Royal Theatre in West Tampa, and was highly regarded by his many friends in the industry. He is survived by his wife and two children.

Millard Alford, 54, member of Local 589, Jackson-Vicksburg, Miss., died last month at the Baptist Hospital in Jackson. Alford joined the Local back in 1926 and at the time of his death, he worked in the projection room of the 51 Drive-In Theatre.

John A. Fisher, 68, member of St. Louis Local 143 since 1909, died last month after a two-week illness. A staunch and loyal unionist, Fisher was an active worker in fund-raising campaigns for the Local back in the days when it depended upon the proceeds from "movie balls" as its chief source of revenue. He worked in many film houses in St. Louis, last being employed at the World Playhouse. He is survived by a son, John J., also a member of the Local, and one daughter, Mrs. Margaret Nilhas.

Color Tv Near Approval

Color television for the home has received tentative FCC approval, but it probably will be quite a while before color Tv can bother the motion picture exhibition field competitively.

Only a few experimental color Tv sets are now in existence, and production probably will be in very small quantities for some time after final FCC approval which is expected this Fall. Estimates of prices for color Tv sets range from $700 to $1,000 for the first color models with a screen size considerably smaller than that of most black-and-white Tv receivers now on the market.

The color system that the FCC proposes to authorize is sponsored by the National Television System Committee, a technical group representing the entire Tv industry. The system is similar to the plan proposed some years ago by the Radio Corp. of America but rejected at that time. It solves many problems because it is what the Tv industry calls "compatible," that is, the color images transmitted by this system can also be picked up in black-and-white on present receivers.

3-D Effect for Video

A television set designed to give viewers an image with a 3-D effect has been announced by D. J. Roesch of Los Angeles. Equipped with a 27-inch tube, the receiver is said to provide more depth than has previously been possible, but it is not a true 3-D process such as the movies attain through the use of double images and glasses, Mr. Roesch said.

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New Synthetic Film Base by Du Pont Detailed

A NEW synthetic base for motion picture film, said to be much stronger than the present types of acetate safety film base, will be manufactured by the Du Pont Co. at a new factory unit to be built at the firm's Parlin, N. J., plant with production beginning in 1955. The Du Pont announcement states:

"Extensive tests have shown that the new base, identified as a polyester and related chemically to the Du Pont textile fibre, Dacron, is several times stronger and has much more dimensional stability than any of the present types of safety film base, and has comparable flame resistance. For use in motion picture film, this new polyester offers the important added advantage of reduction in film thickness, making possible greater footage per reel. Polyester film has higher clarity than conventional film bases, and appears to have better storage and aging characteristics.

"The new base was developed and is currently being made in limited experimental quantities. Construction of the full-scale unit at Parlin will start in the near future, and completion and initial production are forecast for the middle of 1955.

"Compared with either cellulose nitrate or cellulose acetate films, polyester has twice the tensile strength and tear strength, and can be stretched more than 4 times as far before breaking. It is virtually unaffected by immersion in water or changes in humidity. In a test of folding endurance, polyester film withstood 17,000 flexings, while an ordinary film failed after about 100. Polyester film showed virtually no signs of wear after 3900 runs through a motion picture projector; perforations on standard films wore out after 1400 projections.

"Because of its greater toughness and flexibility, the polyester base makes it possible to reduce the thickness of standard motion picture film from 5½ mils to 4 mils (5 thousandths to 4 thousandths of an inch), a 27% reduction. This means that the new base will significantly reduce shipping weight and storage volume per foot of film, besides enabling producers to put up to 35% more film footage on a given reel.

"A 2700-foot reel of 35-mm motion picture film on 4-mil polyester base takes up the same amount of space and weighs approximately the same as a reel holding 2000 feet of film on the current standard safety base.

"An important feature of the process is the fact that there is no industrial waste-disposal problem. No solvents are used in the casting of polyester base, whereas in the manufacture of conventional film base there is a definite solvent recovery problem.

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Excelite "135" Developed

An increased volume of light at the screen, without a corresponding increase in heat at the aperture, is claimed for the new National Excelite "135" projection arclamp announced by National Theatre Supply. A feature of the new lamp is the Reflect-O-Heat unit, which passes the visible light while diverting heat rays back into the lamphouse where heat is removed through the stack.

Designed to burn 10-mm Hitex carbons at 135 amperes, or 11-mm regular carbons at 120 amperes, the lamp provides increased light for 3-D and wide-screen projection. For the full-hour running period of 5,000-foot 3-D reels, the 10-mm Hitex can be burned at 120 amperes or the 11-mm regular carbon can be burned at 115 amperes, the company said.

Color value and intensity of the light at the screen is maintained constant throughout the full trim, without the need of manual adjustment, it was stated, by an automatic arc crater positioner. The National Excelite "135" will be sold by all National Theatre Supply branches.

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"Movies" first appeared in 1833 when a device called the "Zoetrope" was marketed. This consisted of a cylinder with drawings of a horse mounted on the inside. The viewer looked through an eyepiece, rotated the cylinder and saw the horse galloping.

PERSONAL NOTES

WALTER FRICK, formerly with the Theatre Equipment Co., Toledo, and recently in charge of six U.S. Army post theatres at Camp Gordon, Ga., has joined the Strong Electric Corp., Toledo, as a sales and service engineer. His territory will include the whole country, and his interests will include projection arc lamps, rectifiers and spotlights for the theatre field in addition to slide projectors for the visual education market.

Walter Frick who has joined the Strong Electric Corp., Toledo, as sales and service manager.

C & C Dual-Range Rectifiers

The McColphin-Christie Corp. reports that in theatres where new equipment is being purchased for 3-D and widescreen projection, the dual-output ranges of the company's "C and C" 12-phase selenium arclamp rectifiers will be of special interest. The units are available from 1-KW size up to and including Hy Candescent operation.

The dual output range of the rectifiers makes it possible for a theatre to install a given size C and C rectifier today, the company states, operate it on the low output range, and then switch to the high range for more output when amperage requirements increase with 3-D and wide-screen projection. Distributor for the product is National Theatre Supply.

Westrex Magnetic Sound

Westrex announces that it is now in production on a pent house type reproducer which will fit above the projector and under the upper magazine of any standard type projector to reproduce four-track CinemaScope recording or any other multi-track system. Limited deliveries have started and will be greatly stepped up in September and October.

Skiatron Shows Fee-Tv

Public demonstrations of the Skiatron system of collecting fees from the viewer for special high-quality television shows were held recently in New York and attracted considerable attention among radio, Tv and motion picture people.

The Skiatron Corp. calls this system "Subscriber-Vision." It works through a special decoding device on the Tv set which restores to normal a scrambled picture broadcast from the Tv station. The decoding device is activated through a printed circuit on a card that would be mailed weekly to subscribers. A petition for FCC approval is expected this Fall.

Wide-Screen Shortages

Wide-screen installations throughout the country are being slowed down by equipment shortages, it was revealed by a survey made early this month. At that time there were only about 200 wide-screen installations ready for operation, excluding those houses that already had screens large enough for the new aspect ratios. The wide-angle lenses needed were in particularly short supply because there has been little call for them in many years.

CinemaScope lenses were being stockpiled by 20th Century-Fox, which had not released any to dealers. Wide screens of the 2.5 to 1 variety needed for CinemaScope were also difficult to obtain. Theatres ordering such screens could not expect delivery until the end of September.

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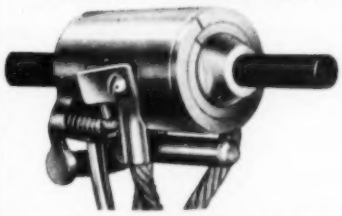

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EVERYDAY SCIENCE

SOUND engineers usually come to the attention of projectionists these days in connection with stereophonic sound, acoustics or some other subject related to the theatre. However, these men have been entering some unusual fields lately. In Ventura, Calif., an oil well drilling rig has been constructed that cuts through the earth with the aid of low-frequency sound waves which "fatigue" and break up the formation ahead of the drilling bit. These sound waves are carried down into the earth by a method of vibrating the drill casing from above.

• • •

PHOTOCELLS, the familiar component of projection soundheads, have made their debut this year as a "revolutionary" development in the automotive field. A photocell device, mounted inside the windshield and activated by the headlight beams of oncoming autos, automatically dims the headlight beam of the auto in which it is installed. This device is now available as optional equipment on most General Motors cars. It is supposed to eliminate tiresome footwork in night driving and may protect some conscientious drivers from those careless characters who don't bother to step on the button.

• • •

INTEREST in binaural or stereophonic sound has now extended to radio broadcasting in New York City. WQXR is transmitting musical programs in such a way that the sounds normally reaching the left ear in a concert hall are broadcast on an AM band and the right-ear sounds are broadcast over FM. If a listener possesses two radios, one AM and the other FM, he can get binaural musical reception in his living room by properly placing the receivers.

The great Italian artist and scientist, Leonardo da Vinci, noted the principal of the camera obscura as far back as the year 1470.

STEREOSCOPIC PROJECTION

(Continued from page 23)

amine this double photograph through a stereoscope. The scene looks very real — the tree seems much closer than the mountain. This is because the two tree-images of the stereopair are closer together than the two mountain-images. Our eyes must converge to see the tree-image clearly, and they must look straight ahead to see the mountain-image clearly. The binocular viewing conditions of real-life experience are thus exactly duplicated in the stereoscope.

In normal stereophotography the camera lenses point straight ahead to include identical fields of view at "infinite distance." If they did not point straight ahead, but converged by even the tiniest amount, each picture would have a vertical edge-area of scenery not included in the other. Moreover, any defects in the lenses such as spherical aberration, pincushion distortion, or barrel distortion would then show up as a binocular aberration.

To converge the two lenses or diagonal mirrors of a 3-D camera upon a foreground subject simply because the eyes converge upon the subject that a person looks at in real life is fallacious reasoning and extremely bad practice. Camera-lens convergence produces a "double convergence" because the eyes converge upon foreground subjects in a 3-D reproduction when the camera lenses don't converge! If the eyes should not themselves converge, the picture could not be 3-D!

Camera Convergence Wrong

The evil effects of camera-lens convergence are far worse than the minor defects mentioned above, however.

Suppose that we photograph a stereogram for an old-fashioned stereoscope with the camera lenses "pointed in" to converge upon a foreground object. Inspection of the resulting stereopair after it has been properly mounted on a card, with left and right pictures side by side, will reveal that the effect is exactly the same as that

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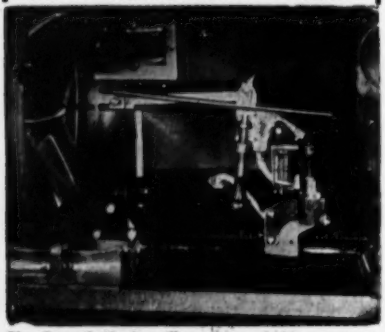

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obtained by mounting a "normal" stereopair with the pictures placed farther apart. Let us do this and call the result a "convergence stereogram" and compare its 3-D appearance with that of a normal stereogram.

In the normal stereogram, identical distant background objects of the two pictures will be adjusted to a separation of exactly 3¼ inches, the correct standard for the old-fashioned stereoscope of grandma's day. In the convergence stereogram, similar distant background objects will have a wider separation.

Through the stereoscope the normal stereogram impresses us favorably with its realism. The nearest objects will look very near, if sufficient interocular distance was used in photography, objects at middle distance will look farther away, and distant background will look truly distant — far behind the stereogram card. And we are able to shift our vision from foreground to background without discomfort or unnatural effect.

The convergence stereogram, on the other hand, strikes us as unnatural and eye-straining. Something serious is obviously wrong with it. Foreground objects look strangely immense and too far away. Background objects seem to "pull our eyes apart," producing positive physical pain, and the least relaxation of our ocular vigilance allows distant objects to separate into unpleasing double images. Continued viewing produces headache and nausea in susceptible individuals.

Is this a mere guess, or a matter of mental suggestion? It is neither!

How Eyestrain Results

The physiological effect of convergence stereophotography is illustrated in Fig. 3. The observer pictured is assumed to be looking at the distant background in a 3-D movie close-up filmed by the convergence technique. Note that the background images force the eyeballs of the observer to turn so that the optical axes of his two eyes diverge, rather than converge or remain parallel, as in normal viewing. The nearer the screen the observer sits, the more his lines of sight will diverge. Not only is this visual experience painful, but, because our eyes are not made to turn outward beyond parallel lines of sight, it must be regarded as harmful.

To repeat: the properly aligned 3-D camera "looks" straight ahead, but the 3-D movie patron's eyes converge automatically and naturally upon the nearer objects in the picture.

The foregoing discussion suggests how the projectionist can actually eliminate or create the effects of camera-lens convergence on his 3-D screen regardless of how the picture was photographed. A study of Fig. 4 will make the matter clear.

The screen depicted at the left shows the superposition of the left- and right-eye images of distant and near objects in a correctly aligned polarized-light picture. Note that the left and right images of a presumably "infinitely distant" object coincide to give a single image when viewed without Polaroid glasses, while in the case of the near object the left-eye image is formed at the right of the right-eye image.

Eyeballs Turn Outward

Compare this with the screen on the right, which depicts the superposition obtained by the convergence technique. Here the left and right images of the foreground object coincide, making an actor's face appear as far away as the movie screen, and enormously large. Observe, also, that when the patron looks beyond the actor's head to the "infinitely distant" background, the optical axis of his left eye must turn outward to the left (dotted circle) while that of his right eye must diverge to the right (continuous circle). This is the divergence that seems to pull the eyes apart, and actually does do just that!

A little careful thought suffices to reveal that the natural 3-D effects de-

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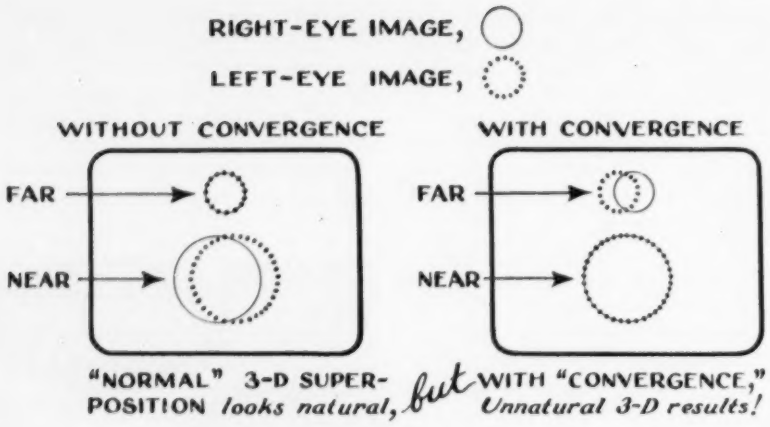

FIGURE 4

picted on the screen at the left can be duplicated on the other screen by turning the picture projectors in toward each other by a very slight amount—an amount just sufficient to make the two images of the "infinitely distant" object superimpose in exact registration. This simple projection-room expedient actually destroys all of the undesirable "convergence" effect, but it is not a practical step. Because the amount of convergence is variable, changing from scene to scene, it is clearly beyond the power of any projectionist to line up his projectors to overcome it.

By reversing the process (that is, by turning the projectors outward very slightly) the effects of convergence-photography can be introduced into a correctly photographed 3-D film. This is something no projectionist would wish to do.

Seating and Convergence

It might seem that a slight amount of convergence is desirable because it introduces *distance* into the picture. A patron in the middle of the auditorium may be 40 or 50 or 60 feet from the screen. Without convergence, the most distant landscape appears to be as far away as the screen. Is the screen in the average theatre too close to the observer for the most perfect stereopsis when no convergence is used in the 3-D photography? Experience indicates that it is not, and common sense cautions us against introducing a convergence-effect which, while giving perfect "distance" for patrons in the rear of the auditorium *who need no additional "distance,"* strains the eyes and good dispositions of patrons seated near the screen.

Use of convergence-photography pushes everything in the picture away from the observer while seeming to magnify objects. Even though relative distances and depths are preserved — parallax differences remain the same, — the effect is unnatural and, as we have said, wrenches the eye-muscles of the patron who looks at background objects in close-ups. And there are two other flaws in the convergence technique.

Intimacy Lost

All feeling of intimacy is lost in a convergence-photographed 3-D film. The actors seldom "come into the audience" as they should do in all close-up shots. The background, it is true, may look much farther away than the actor (thus suggesting the actor's proximity), but there is no true-to-life intimacy. Conversely, the theatre patron is never "projected into" the picture as he would be in a correctly photographed 3-D picture. Stereoscopic illusion most certainly exists, but it fails to duplicate the visual sensations of real-life conditions.

Variable-convergence reduces the stereoscopic effectiveness of long-shots. When the patron has become mentally adjusted to the stereoscopic image of the walls of an interior set at a visual parallax which physiologically suggests an "infinite distance" (or even more than that!) he is not going to be overawed, or even pleased, by a subsequent scene which shows distant hills at a visual parallax which physiologically suggests a distance no greater than the distance to the picture screen. In a word, the walls of the interior shot look, or rather "feel," farther away than the mountains of the long-shot!

Producers of motion-picture films can do worse than think twice before committing their expensive 3-D productions to the inevitable horrible visual consequence of the convergence method of filming. Cinematographers should protect the quality of their work by acquainting their directors with the facts of motion-picture stereoscopy.

| TO BE CONTINUED |

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